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# SOME COMMENTS ON THE HITTITE PHONEMIC SYSTEM

WARREN HELD and WILLIAM R. SCHMALSTIEG

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The purpose of this paper is to dispute the claim made by Edgar Sturtevant (1942 and 1951, 29) that in the history of Hittite the phoneme /e/ merged with /i/, thereby giving Hittite three phonemic vowels. According to Sturtevant (1942, 181): "The *e*-signs occurring in Hittite texts are *e*, *el*, *en*, *eš*, *ḫé*, *me*, *ne*, *še*, *te*, *zé*; the *i*-signs are therefore *i*, *il*, *in*, *iš*, *ḫi*, *mi*, *ni*, *ši*, *di*, *ti*, *zi*. The other signs commonly transcribed with *i* (*iḫ*, *ik*, *im*, *ip*, *ir*, *it*, *iz*, *gi*, *ki*, *li*, *pí*, *ri*, *wí*, *kit<sub>g</sub>*, *kir*, *piš*, *lik*, *lim*, *liš*, *miš*, *mit*, *nir*, *pít*, *bil*, *pir*, *šir*, *tim*, *tin*, *dir*, *tir*) may represent *e* or *i* indifferently."

The implication seems to be that if there existed paired *i*- and *e*-signs the *e*-sign denoted /e/ and the sign commonly transcribed as the *i*-sign necessarily always denoted /i/. The existence of doublet signs does not necessarily mean this at all. The fact that the sign *eš* may always have denoted an /e/ vowel does not mean that the sign transcribed by *iš* always denoted an /i/ vowel. The sign *iš* may just as well have denoted phonemic /eš/ or /æš/. (One might also point out here that the same sign is used to denote *aḫ*, *eḫ*, *iḫ*, *uḫ*.) The fact that the Latin letter *j* almost invariably denotes /dž/ in English does not mean that the letter *g* always denotes /g/ and never /dž/.

Sturtevant says: (1951, 20): "Besides the vowel sign *i* there are 38 syllabic signs containing *i*. Although these signs are frequently used for *e* . . . , the converse is not true; the use of the *e*-signs to denote *i* is altogether exceptional. Written *e* occurs occasionally in the nominative and accusative singular of *i*-stems (e.g., *a-ra-u-wa-an-ni-eš*, *ki-iš-ri-eš*, *lu-li-mi-eš*, *sal-li-eš*, *ḫal-li-en*, *dam-pu-pi-en*, *ú-e-še-in*). Besides countless examples of *ku-iš* and *ku-in* we find *ku-i-e-ša-aš* *ku-iš* (KBo. V.3.I.14), *ku-i-e-ša-aš* (KBoV3II33), *ku-e-iš-ki* (KUBXIV14II18). These forms are further evidence for the change of *e* to *i* after the Hittite language began to be written." We shall return to the *i*-stem nouns (which we really don't believe are *i*-stems) later. But for the other several examples Sturtevant is right that the cases of written *e* for expected *i* are indeed evidence for the merger of /e/ and /i/. But one may well

wonder exactly why there are so many examples of written *i* for etymological /e/ and only several examples of written *e* for etymological /i/. If indeed /e/ and /i/ did merge phonemically, there would be no way for the scribes to know which sign to use. Thus we should expect that *e*-signs for etymological /i/ should be just as common as *i*-signs for etymological /e/. If both signs did ever denote exactly the same phoneme, there seems to be no reason why the scribe should retain the etymological orthography for words with *i*-signs any better than the etymological orthography with *e*-signs. The confusion should be equally great in both directions. Doublet forms such as <sup>URU</sup>*Ne-i-ia* and <sup>URU</sup>*Ni-ia* bear witness to the scribal confusion.

Sturtevant also says (1942, 185): "This theory is not weakened by the fact that the early texts show even more variation between *e* and *i* than the later ones do. All our tablets were inscribed in the 14th and 13th centuries and apparently the copies of old texts, like the others, were normally written down from dictation; the greater frequency of unfamiliar forms in them necessarily threw the scribes largely upon their own resources, since, whenever the tradition was unknown, the scribes must write according to their own phonemic system, in which *e* and *i* were equivalent." But, since all of the signs usually transcribed as *i*-signs could also denote /e/, the only evidence for Sturtevant's assertion seems to come from those few cases where the *e*-signs were used to denote /i/. Those few examples could well be scribal errors. In addition, it is not at all certain that all the copies of the tablets were dictated aloud to a scribe who wrote down what he heard. Some tablets may well have been written down by a scribe who merely copied what he saw on another tablet. It should always be kept in mind that the Hittite phonemic system existed first and that the scribes made do with a writing system originally designed for another language. Curiously enough if one studies the grammars of languages written with cuneiform one could easily come to the conclusion that all of them have similar vocalic systems. The reason for this is that each grammar starts from the evidence of the writing system. Since cuneiform can distinguish four or five vowels (depending upon whether you class *u* and *û* together or not), it seems to be assumed that languages written in cuneiform do the same. It would make just as much sense to analyze all of the languages written with the Latin alphabet as having five vowel phonemes because we do have five letters to denote vowels in the Latin alphabet, viz., *a*, *e*, *i*, *o*, *u*. We believe, however, that it would be quite surprising if all the languages written with cuneiform did have exactly the same number of vowel phonemes. Presumably

Hittite may have had a certain number of phonemes regardless of the capacity of the cuneiform writing system to denote these phonemes. It should be mentioned also that the Hittite scribes did not add new signs to the Babylonian sign list.

It is clear, however, that a writing system does not need to correspond very closely to the phonemics of a language for the native speakers of that language. A person reading his own language needs far fewer orthographic cues than the non-native trying to decipher that language. It would hardly be necessary to make this point except for the fact that many scholars would like to ascribe to every minor spelling variation some kind of phonological significance. It seems quite possible that the Hittite scribes were encouraged to spell words as they themselves thought they sounded, and, as a result, we have the large number of variant forms instead of the "frozen" spelling of contemporary English.

Erica Reiner says (1966, 30, 31): "While it is well known that the writing system (cuneiform -WH & WRS) was not designed for Akkadian, it is not generally accepted that it was not designed for Sumerian either. Statements found in several articles on the subject which, after reconstructing the Sumerian phonology from the writing system, and the Akkadian phonology from the same writing system, find that the two phonological systems are indeed very close, only point up the inadequacy of the writing system for either language. It seems to me that the more one is able to match the phonemes—and a fortiori, the phones—of the two languages on the basis of the common writing system, the less likely it becomes that there was an original fit between Sumerian writing and Sumerian language. Hence the assumption—in my mind unwarranted—of a quasiperfect fit involving two languages as different as Sumerian and Akkadian can only indicate that there is a fit with neither." But if this is true for Akkadian and Sumerian, how much more true it must be for Hittite.

We propose then that Hittite had a six-vowel phonemic system. Taking up a suggestion of Sturtevant himself (1942, 191 and 1933, 54) we propose that Indo-European \*/eu, au, ou/ passed to Hittite /o/ and that Indo-European \*/ei, ai, oi/ passed to Hittite /e/ creating the phonemic system outlined below.

i	u
e < */ei, ai, oi/	o < */au, ou, eu/
æ	a

There is certainly nothing surprising about an orthography which does not distinguish between an /e/ and an /æ/. Italian offers such a situation. Linguists, being interested in language for its own sake, greatly overemphasize the importance of the orthography for the user of the language, who considers the orthography as a means to the end of communicating his ideas, not primarily as a means of representing the phonetic or even the phonemic system of the language. The linguist who tries to make too much out of the orthography suffers from a kind of cultural ethnocentrism.

We assume that for the most part the /i/ was written with *i*-signs although on occasion with *e*-signs and perhaps even at times by a sequence of two or more signs, the first of which contained a final -*a* element and the second of which contained an initial *i* element or the *i*-sign itself. The /æ/ was most commonly written with *e*-signs, although perhaps occasionally written with *i*-signs.

The chief reason for assuming a six-vowel phonemic system is the fact that in such six-vowel systems there seems to be a tendency for the two lowest vowels to be just barely contrastive if there seems to be phonemic palatalization of the consonants, something which may be true of Hittite. This latter point will be discussed later. First we shall draw some parallels from Baltic and Slavic.

In Lithuanian, for example, /ė/ and /ą/ are just barely phonemic. Ordinarily the phoneme /ė/ appears after a palatalized consonant or /j/, and /ą/ after an unpalatalized consonant. Only in word initial position do these two phonemes contrast in contemporary standard Lithuanian where we find e.g., *esą*, the nom. pl. masc. pres. act. participle of *būti* 'to be,' vs. *ąsą* the acc. sg. of *ąsa* 'handle.'

The dialectal rendering of /ė/ and /ą/ is quite varied (see Zinkevičius, 1966, 122-125). For example, many dialects replace initial /e/ by /a/. In these dialects we find *ašerỹs* 'perch' for standard Lithuanian *ešerỹs*, and *ąžeras* 'lake' for standard Lithuanian *ėžeras*. Among the older people, however, the shift of /e/ to /a/ has only taken place in unstressed position so that they say *ašerỹs* for standard *ešerỹs*, but *ėžeras* just as in the standard language. Presumably the change of /ė/ to /ą/ took place first in unstressed position and only later in stressed position. An interesting feature is the fact that in some dialects there are doublet forms with initial /e/ or /a/ for which the vacillation is so great that it is sometimes difficult to know which is the form characteristic of that particular dialect. The reasons for this vacillation may be varied. For the most part it is probably dialect mixture or word bor-



rowing from one dialect to another. In addition this vacillation between initial /e/ and /a/ is also found in words borrowed from other languages. Thus we find e.g., *advērija* 'door-posts' vs. *edvērija*, *apciūgos* 'pliers' (\*ā-stem pl. ending) vs. *epciūgai* (\*o-stem pl. ending), *āsilas* 'donkey' vs. *ēselas*, etc.

Lithuanian has a six-vowel phonemic system:

ĩ	ũ
ė	õ
ę	ą

It is, of course, the two low vowels which are just barely contrastive and which vacillate in the words mentioned above.

It can also be pointed out that in standard Lithuanian both orthographic *e* and *ia* denote the same phoneme, viz. /ė/. In principle *i* denotes the palatalization of a preceding consonant in this sequence; the palatized consonant in turn has fronted an etymological /ǎ/ to /ę/. Thus the word written *kėlias* 'path' is phonemically /kė̃les/. It would seem likely to us that an investigator who had no knowledge of the Lithuanian phonemic system outside of what the orthography affords would surely be led to believe that the quality of the two vowels in *kėlias* is different. But the quality is actually the same and the quantity (which in this word is not indicated in the writing system) is different, the first vowel being long and the second short.

Next we shall draw some parallels from Slavic. In Old Church Slavonic at least three degrees of vocalic height must be posited (and perhaps four if it is assumed that the jers had a different vocalic height from /i/ and /u/ respectively). Thus we have again a system with a large number of vocalic heights and phonemic palatalization of consonants. In such a system it seems natural to expect there to be vacillation between the two lowest vowels. And indeed we find that in the oldest script in use for Old Church Slavonic, the Glagolitic, there is only one letter, viz. **▲** to denote both the phoneme /ě/ and the phoneme sequence /ja/. The Old Church Slavonic situation is somewhat different from the Lithuanian situation in that in the former language the two lowest vowels, viz. /ě/ and /a/ contrast after unpalatalized consonants; after /j/ and the etymologically palatalized consonants the contrast between /ě/ and /a/ is neutralized.

The Slavic situation is too complicated to allow us to give all the details here, but a few remarks are in order to show the vacillation

between /ě/ and /a/. In principle any Slavic /ě/ (from IE \*/ē/) following a palatalized consonant passed to /a/ in Russian. In word initial position Slavic /ě/ passed to Russian /ja/. Thus the Slavic successor of IE \*ēghom 'I' (which has the reflex of the long initial vowel in Slavic) is Russian /ja/; Slavic *sto(j)ěti* 'to stand' is rendered by modern Russian *stojat*, etc. Interestingly enough the /e/ vowel is sometimes restored by analogy (on the pattern of those forms in which a /ě/ passed to /e/ following an etymologically unpalatalized consonant), so that we now find cases in Russian where the same etymological /ě/ is represented by /je/ in one word and by /ja/ in a cognate word. Thus the Indo-European root \*ēd- 'to eat' (the lengthened grade of the root is attested in Balto-Slavic) has given both Russian *jad* 'poison' and *est* 'to eat' = /jesť/ (from \*ēd-tei). In some cases the initial /j/ which developed before an etymological \*/ē/ dropped, so that we now find, for example, Bulgarian *az* 'I' from \*ēghom.

It seems most likely to us then, that the Hittite vacillation in the use of orthographic *e* and *a* is to be explained as reflecting neutralization of the /æ/ vs. /a/ contrast. This neutralization took place in unstressed syllables and after an etymological \*/j/. (It is possible that a \*/j/ coalesced with a preceding consonant to form a palatalized consonant, a phenomenon common to many languages, e.g., Balto-Slavic, pre-Greek, etc.) Probably the realization of the archiphoneme after a palatalized consonant was /æ/. The following orthographic variants reflect this neutralization and are followed by a tentative phonemicization:

- (1) *šu-ú-ni-ia-zi*, *šu-ú-ni-iz-zi* 'fills' = /suńæzi/
- (2) *hu-(u-)la-(a-)li-(ia-)zi*, *hu-u-la-li-i-e-iz-zi* 'winds' = /holalæzi/
- (3) *iš-ki-ia-iz-zi*, *iš-ki-iz-zi* 'anoints' = /iskæzi/
- (4) *iš-par-ri-ia-az-zi*, *iš-par-ri-iz-zi* 'spreads' = /spařæzi/
- (5) *ku-uš-ša-ni-ia-zi*, *ku-uš-ša-ni-i-e-iz-zi* 'hires' = /kus(a)ńæzi/
- (6) *ú-e-mi-ia-(az-)zi*, *ú-e-mi-(e-)iz-zi*, *ú-e-mi-az-zi* 'finds' = /weńæzi/
- (7) *i-ia-(az-)zi*, *i-(e-)iz-zi*, *i-e-zi* 'does, makes' = /jaezi/
- (8) *ti-ia-(az-)zi*, *ti-i-e-(iz-)zi*, *ti-ia-(e-)iz-zi* 'takes his stand' = /tejaezi/
- (9) *ta-a-it-te-ni*, *ta-ia-at-te-ni* 'you conceal' = /tajætæni/
- (10) *ši-i-e-iz-zi*, *ši-i-ia-iz-zi* 'presses down' = /sejæzi/; the two forms do not (as Sturtevant and Trager, 1943, 220 maintain) reflect [sitsi] and [siaitsi] respectively.

Possibly the doublet forms *ú-wa-te-i-z-zi* 'he brings' vs. *ú-wa-da-az-zi* 'id.' are to be explained by ascribing the first to an etymological *\*je/o*-stem conjugation and the second to the *\*e/o* stem conjugation. As has been pointed out before (Schmalstieg, 1966), the loss of the contrast between Indo-European *\*e/* and *\*o/* in the verbal thematic vowel is probably due to the neutralization of that contrast after a *\*/j/* or a palatalized consonant.

We are also of the opinion that the so-called *i*-stem adjectives and nouns in Hittite may well be etymological *\*jo*-stems. Thus the nom. sg. *ḫa-en-te-i-z-zi-iš* and *ḫa-an-te-i-z-zi-(i)a-aš* 'first' are both to be phonemicized as /hantežæs/ or /hantæžæs/ and the variant forms of the acc. sg. *ḫa-an-te-i-z-zi-in* and *ḫa-an-te-i-z-zi-(i)a-an* are both to be phonemicized as /hantežæn/ or /hantæžæn/. In this case an Indo-European phonemic sequence *\*/jo/* passed to Hittite /ja/ in which the /j/ (or palatalized consonant deriving from the coalescence with /j/ fronted the /a/ to /æ/).

One may note that the case endings of this stem category seem to be the same as those of the etymological *\*o*-(Hittite *a*-) stems, but with palatalization of the stem-final consonant:

	Hittite <i>a</i> -stems	So-called <i>i</i> -stems (Probably etymological <i>*jo</i> -stems)
Singular	Nom. <i>an-tu-uḫ-ša-aš</i> 'man'	<i>tu-uz-zi-iš</i> , <i>tu-uz-zi-(i)a-aš</i> 'army,' <i>ḫal-ki-iš</i> 'grain'
	Gen. <i>an-tu-uḫ-ša-aš</i>	<i>tu-uz-zi-i-a-aš</i>
	Dat. <i>an-tu-uḫ-ši</i> <i>a-aš-ka</i> 'gate'	<i>tu-zi</i> , <i>tu-uz-zi-i-a</i>
	Acc. <i>an-tu-uḫ-ša-an</i>	<i>tu-uz-zi-in</i> , <i>ḫal-ki-in</i> , <i>ḫal-ki-i-a-an</i>
	Abl. <i>an-tu-uḫ-ša-az</i>	<i>tu-uz-zi-i-i-a-az</i> , <i>ḫa-an-te-i-z-zi-i-a-az</i> 'first'
	Inst. <i>an-tu-uḫ-ši-it</i>	<i>tu-uz-zi-it</i> , <i>ḫal-ki-it</i> 'grain'
Plural	Nom. <i>an-tu-uḫ-še-eš</i> <i>an-tu-uḫ-ši-iš</i>	<i>tu-uz-zi-e-eš</i> , <i>ḫal-ki-e-eš</i>
	Gen. <i>an-tu-uḫ-ša-aš</i>	<i>tu-uz-zi-i-a-aš</i> , <i>ḫal-ki-i-a-aš</i>
	Acc. <i>an-tu-uḫ-šu-uš</i>	<i>tu-uz-zi-uš</i> , <i>ḫal-ki-uš</i>

Sturtevant (1934) argues that many Indo-European *\*jo*-stem adjectives result from the transfer of the *\*i*-stems to the *\*jo*-stem category. We can readily agree that the *\*jo*-stems arise from a thematization of the *\*i*-stems. We doubt, however, that the spelling difference between *ḫa-an-te-i-z-zi-iš*, *tu-uz-zi-iš* on the one hand and *ḫa-an-te-i-z-zi-(i)a-aš*, *tu-uz-zi-(i)a-aš* on the other hand has anything to do with this Indo-

European distinction. The orthographic vacillation here seems perfectly parallel to that found in such verbal forms as, e.g., *iš-pár-ri-ia-až-zi*- vs. *iš-pár-ri-iž-zi* 'spreads' mentioned above.

There is also some evidence for the neutralization of the /æ/ vs. /a/ contrast after the labial (glide?) /w/. Thus the root *waš(š)*- 'to dress' has a variant *weš(š)*- (Friedrich, 1952); the root *weḫ*- 'to turn' has a variant *wah*- (Friedrich, 1952, 250); the word (*ú*-)*wa-a-tar* 'water' has the variant form *ú-wi-ta-ar* (Sturtevant, 1953, 97); *ú-wa-an-zi* 'they go' has the variant *ú-en-zi* (Sturtevant, 1953, 156).

In addition to the cases of neutralization of the /æ/ vs. /a/ contrast after palatalized consonants, /j/ and /w/ there is also evidence for the neutralization of this contrast elsewhere. In most of these cases we suggest that the contrast was neutralized in unstressed syllables. The Hittite situation can be compared to that of those Lithuanian dialects in which /e/ has passed to /a/ (originally in unstressed position). We believe that in Hittite there was a tendency for unstressed /æ/ to pass to /a/. In such cases the etymological vowel was /æ/ and the innovating vowel was /a/. But since the contrast was disappearing, the scribe was at liberty to write either *a* or *e* in the unstressed syllable. The pronunciation, however, was probably closer to /a/, since the vocal organs tend to be closer to a position of rest in the pronunciation of /a/ than in the pronunciation of /æ/. It may be noted also that in Chomsky and Halle's theory of phonology the vowel /a/ is completely unmarked (1968, 409). We also believe that if the merger was not completely consummated at the time of the writing of the Hittite texts, the retention of the vowel /æ/ was characteristic of slower, more careful speech, whereas the vowel /a/ was characteristic of faster, sloppier speech. The suggestion that /æ/ passed to later /a/ is further supported by the appearance in Luvian and hieroglyphic Hittite of *a* for cuneiform Hittite *e*, e.g., Luvian *ašḫa*-, hieroglyphic Hittite \**ašḫar*- for cuneiform Hittite *ešḫar* 'blood' (see Kronasser, 1956, 39). Examples of the vacillation between orthographic *e* and *a* are given below:

- (1) *ša-ša-an-zi*, *še-e-ša-an-zi* 'they sleep'
- (2) *a-ku-(wa-)an-zi*, *e-ku-wa-an-zi* 'they drink'
- (3) *a-ša-an-zi*, *e-ša-an-zi* 'they are'
- (4) *aḫ-te-ni*, *e-iḫ-te-ni* 'you take'
- (5) *aḫ-ḫu-en*, *e-iḫ-ḫu-en* 'we took'

(Although presumably in stressed position, since the word is probably monosyllabic, particularly instructive is the form *a-iḫ-ta* = the



more usual *e-ip-ta* 'he took.' The initial *a* denotes the open nature of the vowel, whereas the *i* denotes that it is front.)

- (6) *a-ki-ir* (*a-kir*), *e-ki-ir* (*e-kir*) 'they died'
- (7) *ḫa-aš-ša-an-zi*, *ḫé-e-ša-an-zi* 'they open'
- (8) *a-aš-zi*, *e-eš-zi* 'he sets'
- (9) *a-ša-an-zi*, *e-ša-an-zi* 'they set'
- (10) *pa-it-te-ni*, *pa-it-la-ni* 'you go'
- (11) *da-aš-ga-u-e-ni*, *da-aš-ki-u-wa-ni* 'we take'
- (12) *a-ša-aš-ta*, *a-še-eš-ta*, *e-še-eš-ta* 'he set, founded'

Possibly in this example either the first or the second syllable could have been stressed. In any case the example is good because it shows vacillation in both syllables and certainly no one would wish to ascribe different ablaut grades to all these various forms.

- (13) *ša-a-ak-ti*, *še-ik-ti* 'you [sg.] know'
- (14) *ša-ak-te-ni*, *še-ik-te-ni* 'you [pl.] know'
- (15) (*a-*)*ar-te-ni*, (*e-*)*ir-te-ni* 'you arrive'

Perhaps some of the examples of the apparent vacillation between /æ/ and /a/ do indeed reflect the Indo-European ablaut grades \*/e/ and \*/o/ respectively, although it would probably be difficult to determine exactly where we are dealing with original ablaut differentiation and where we find merely the neutralization of a phonemic contrast.

Next we propose that the Hittite *a*-stem dative case ending was -/e/ (from IE \*/oi/). In principle it seems to us that an /e/ was written with orthographic *i*. On the other hand, here also we find considerable vacillation. Thus one encounters the dative ending -*a*, -*e* and indeed possibly the etymological -*ai* (reflecting the ending before monophthongization?).

The forms are: *iš-ḫi(-i)*, *eš-ḫé* 'master,' *la-aḫ-ḫi*, *la-aḫ-ḫe* 'campaign,' *pí-di*, *pí-e-di-eš-se*, *pí-e-te-še* 'in (his) place,' <sup>LC</sup> *ḫa-mi-na-a-i* 'chamberlain,' *is-ḫi-iš-še*, *iš-ḫa-aš-še* 'master,' *li-in-ga-i*, 'oath,' <sup>DUG</sup> *ḫar-ḫa-ra-i*, <sup>DUG</sup> *ḫar-ḫa-ra-e* 'vessel for beverages,' *ḫa-aš-ša-an-na-i* 'family,' *La-ba-ar-na-i* 'king.'

The dative ending -*a* is also attested in such words as *a-ru-na* 'sea' *a-aš-ka* 'gate,' *ḫa-aš-ša-an-na* 'family,' *iš-ki-ša* 'back,' *gi-im-ra* 'campaign,' *la-aḫ-ḫa* 'campaign,' *šu-uḫ-ḫa* 'roof,' *ḫa-ar-ri-ia* 'valley.' Sturtevant (1953, 87) suggests that the datives in -*a* and -*ai* are two sandhi-forms of Indo-Hittite -*ōy* (cf. -*ōi*, Lat. -*ō*, etc). According to Kronasser (1956, 101), the forms in -*a* are limited to directional function, e.g. *nān ... aška unnai* 'and he brings him to the door.' Thus there does seem to be a difference in syntactic function and it may be necessary to establish a directional case in addition to a dative case.

The dative-locative singular is denoted by *ia* in the forms *lu-ut-ti-ia* 'window,' *tu-uz-zi-ia* 'army,' and *a-u-ri-ia* 'tower.'

Rosenkranz (1953) has shown that the endings of the Hittite *hi*-conjugation which are (1st sg.) *-hi*, (2nd sg.) *-ti*, (3rd sg.) *-i* are to be reconstructed as (1st sg.) *\*-hai*, (2nd sg.) *\*-tai*, (3rd sg.) *\*-ai* respectively. It seems to us that the orthographic *-i* of these endings stands for /e/. There is some slim evidence for /e/ in the 1st sg. ending which is sometimes written as *-hé*, cr. the 1st. sg. *a-ša-aš-hé* 'I found, establish' (Sturtevant, 1953, 160), although this latter is really a very unusual form in the Hittite texts.

Since an Indo-European *\*t/* before *\*i/* was assibilated to */z/*, e.g., *e-eš-zi* 'is' (= Skt. *asti*, etc.), it seems most probable to us that orthographic *ti* usually stands for /te/, although it may well stand for /tæ/ in some instances. This explains the lack of assibilation in the 2nd sg. ending which is phonemically *-te/* derived from earlier *\*-tai/*. Since, as we have said, in principle the *i*-signs are used for the vowel /e/, there is nothing surprising about the 3rd sg. ending orthographic *-i* = /e/ from *\*ai/*. This would also explain the lack of assibilation in words with the stem ending in *-t*, e.g., *ši-(ip-)pa-an-ti* 'pours a libation.' It would likewise explain the form *ši-ip-pa-an-da-i* which either reflects a spelling before the monophthongization of *\*ai/* or else is one way of denoting /e/ in the cuneiform orthography, cf. the similar situation with such datives as *ha-aš-ša-an-na-i*, etc.

It can be suggested also that in the case of *par-ši-ia* 'he breaks' we also have to do with /e/ just as in the case of the datives *tu-uz-zi-ia* mentioned above.

Before continuing it must be noted that there could be no phonemically long diphthongs (i.e., diphthongs with a phonemically long initial element). If, as is widely believed, the original diphthongs were monophthongized, then the old long diphthongs would have no short diphthongs with which to contrast. There may have been short vs. long vowels in Hittite, but no short vs. long diphthongs. We frequently find such transcriptions as *dāi* 'he puts,' *pāi* 'he gives,' etc. If this is interpreted as containing a long vowel /ā/, then the sequence must be read as dissyllabic, viz. /tā[j]i/, or /tā[j]e/, etc. If the sequence is monosyllabic then it must be read as /tai/, etc. with an initial short vowel. Under no circumstances can this sequence be interpreted as *\*tāi/* with a long vowel as the initial element of the diphthong.

An example of a diphthongal stem of the *hi*-conjugation is listed below:

## Present

1 sg.	te-(iḫ-)ḫi, ti-iḫ-ḫi 'I put'
2 sg.	da-it-ti, ta-it-ti
3 sg.	da-a-i
1 pl.	ti-(i-)ja-u-e-ni
2 pl.	da-a-it-te-ni, ta-a-it-te-ni
3 pl.	ti-en-zi, ti-ja-an-zi

## Preterit

1 sg.	te-iḫ-ḫu-un
2 sg.	da-(a)iš, da-iš-ta
3 sg.	da-(a)iš, da-a-iš-ta
1 pl.	ti-ja-u-en
3 pl.	da-a-ir, da-(a)i-(e-)ir

## Imperative

2 sg.	da-(a)i
3 sg.	da-a-ú
2 pl.	da-a-iš-tin
3 pl.	ti-an-du
part.	ti-ja-a-an

In verbs of this class there is a certain amount of suppletion in the conjugation, e.g., we find the 2nd sg. *na-(a)it-ti* 'you lead' beside *ni-it-ti*, *pa-it-ti* 'you give' beside *pa-iš-ti* or the 3rd pl. preterit *na-a-ir* 'they led' and *na-i-ir* beside *ne-i-e-ir*. We assume that all these diphthongal stems ended in \*/oi/ in Indo-European. The 3rd sg. present of the verb 'to lead,' viz. *na-a-i* (phonemically /naje/) derives from a pre-form \*/noiai/. The final -i of the stem \*noi is of course realized as /j/ between the two vowels and the ending \*-ai passed to -e. The jot before the -e was not represented in the orthography, since it was automatic in hiatus position before -e/.

It is well known that the 3rd sg. form of the verb tends to impose its form on the rest of the paradigm for which it tends to serve as a stem (see Calvert Watkins, 1962, 90-96). This is a result of the fact that the third person is pure predication and is not a marked member of the paradigm. Examples of the use of the third person form as the base to which the first and second persons are added are found in many languages. Thus in Persian the present tense of the verb 'to be' is built on the third singular (see the paradigm below):

	Sg.	Pl.
1	hastam	hastim

	Sg.	Pl.
2	hasti	hastid (hastin)
3	hast	hastand (hastan)

Likewise the preterit tense of *kardan* 'to do' is conjugated:

	Sg.	Pl.
1	kardam	kardim
2	kardi	kardid (kardin)
3	kard	kardand (kardan)

In this preterit conjugation the personal endings were added to what was etymologically a participle, cf. Skt. *kṛt'a* 'done.'

In Polish also the etymological 1st and 2nd persons of the present tense of the word 'to be' have been replaced by the 3rd sg. form with the 1st and 2nd sg. endings added directly to it:

	Sg.	Pl.
1	jest-em	jest-eśmy
2	jest-eś	jest-eście
3	jest	są

We therefore propose that those diphthongal stems which seem to have retained the diphthong before the personal ending in persons other than the 3rd singular are re-formed on the basis of the 3rd singular which had begun to function as a suppletive stem. Thus the 2nd sg. present *na-it-ti* = /najete/, *na-iš-te-ni* = /najestæni/, 3rd sg. preterit *na-(a-)iš*, *na-i-iš* = /najes/ or *na-iš-ta*, *na-eš-ta* = /najest/ (note the spelling of the latter form, providing further evidence for the /e/) were all re-formed on the basis of the 3rd sg. present *na-a-i* = /naje/ which functioned as a stem. On the other hand, we also encounter the preconsonantal form of the stem *ne-* beside the innovating forms *naje-*. Therefore in addition to the analogical 2nd sg. *na-it-ti* we also find the form *ni-it-ti* = /nete/ with the expected pre-vocalic form of the diphthongal stem. Interestingly enough, the analogy has worked in the opposite direction as well. Accordingly we find the expected 3rd pl. preterit *na-a-ir*, *na-i-ir* = /najer/ beside the analogical 3rd pl. preterit *ne-i-e-ir* = /nejer/ with the root vocalism /e/ re-established in the stem. In the mediopassive the /e/ vocalism was completely re-established, giving us the forms (1st sg.) *ne-ia-aḥ-ḥa-ri*, (2nd sg.) *ne-ia-at-ti*, (3rd sg.) *ne-ia-(a-)ri* *ne-e-a-ri*, *ne-ia-ri*, (3rd pl.) *ni-ia-an-ta-ri*.

An alternative proposal is that forms with orthographic *ai* such as *na-a-it-ti* may reflect merely an earlier scribal practice dating from the time before the monophthongization of the diphthong \*/ai/. Probably



the only reason for not supposing that orthographic *ai* is another way of writing /e/ is the persistence of the full vocalism in the 3rd sg. of such forms as *iš-ḫa-a-i* 'binds,' *na-a-i*, *da-a-i* 'puts,' etc. Thus we are inclined to view these words as disyllabic.

There are other possibilities. Possibly as the Indo-European etymological \*/ai, oi, ei/ passed to Hittite /e/, the old long diphthongs \*/āi, ōi/ passed to /ai/.<sup>1</sup> Sturtevant (1938a, 15) has argued that such forms as *na-a-i* reflect the pure stem. He compares Hittite *na-a-i* with Skt. *nināya* in which form he claims that the ending *-a* (<\*/e/) of the consonant stems had been added. One could then suppose (as we have done above) that the 3rd sg. with final /ai/ served as the source for the analogical spread of the stem with the diphthong, e.g. for *na-it-ti* = /naite/, whereas the older form with an etymological short diphthong is represented by forms with /e/ such as *ni-it-ti* = /nete/. Sturtevant's proposal would be very convenient for us, but it is difficult to see why a diphthongal stem should be represented by the pure stem in the 3rd sg. present whereas an apparent monophthongal stem such as /ta-i/ (1st sg. *da-aḫ-ḫi* 'I take') is represented by a stem plus an ending.

Still another proposal is that of Risch, who (1955, 191) argues that the etymological long diphthongs \*/āi and \*/āu were monophthongized to *e* and *o* respectively before the *ḫḫ* of the 1st sg. ending, thus explaining *teḫḫi* and *uḫḫi* = [ohhi]. This suggestion could be put in phonemic terms if one imagines a shortening of the etymological \*/āu/ and \*/āi/ before \*/h/ which led to their merger with the original short diphthongs. The vacillation between /e/ and /ai/ in the conjugation of the diphthongal stems could then easily be explained as a result of various different generalizations of the root vocalism /e/ (of the 1st sg.) or /ai/ (of the 2nd sg.).

We might add that we doubt that there is any evidence for a zero grade of the verbs with a diphthongal stem. The orthographic *i*-signs found in such forms as *pī-(i-)ia-u-e-ni* 'we give,' *pī-ia-an-na* 'to give,' etc. merely denote /e/. Since the sign *ti* usually denotes /te/ we assume that such forms as *ti-(i-)ia-u-e-ni* 'we place,' *ti-ia-u-en* 'we placed' are to be read as /tejæwæni/ and /tejæwæn/ respectively.

As stated above, we believe that \*/eu, au, ou/ passed to /o/ just

1. As we have said before, we believe that the Indo-European diphthong \*/oi/ passed to /e/, but here we should qualify that by adding that it passed to /e/ in word final position or if there was a following consonant. If there was a following vowel, however, we suppose a development similar to that of Sanskrit or Slavic, i.e., that the diphthong \*/oi/ passed to \*/ay/.

as \*/ei, ai, oi/ passed to /e/. For the most part /u/ is written with the sign *ú* whereas /o/ is written with the sign *u*, although there are some exceptions (see Sturtevant, 1942, 188-189). The signs *u* and *ú* were probably also used to denote a labial glide possibly similar to English /w/. When they are used to denote a labial glide they are used interchangeably. It is not particularly surprising that they would both be used to represent /w/. Since the lips would be rounded both for the pronunciation of /o/ and for /u/ one can easily see how there would be no need to distinguish them if they were to denote a labial glide. Similarly in English, although we clearly distinguish between /o/ and /u/ the lip rounding for the two vowels is the same as that which is found during the pronunciation of /w/. If there were no letter *w* in English it would seem that either of the vowel letters *o* or *u* would suffice. Thus the interchange of *u* and *ú* before vowels, i.e., when the two signs denote a glide, is to be expected and has nothing to do with the original distinction between /o/ and /u/. This point is well confirmed by the evidence of Sturtevant and Trager (1942a). As Sturtevant and Trager say (1942a, 268): "Probably the strongest case can be made out for a phonemic distinction between *wa-a-tar* 'water' (nom.-acc.), which occurs with this orthography 39 times in our material, and *ú-wa-(a-)tar* 'sight, review, parade.' This constant difference appears like the minimal distinctive differences employed in analyzing a language now spoken in order to determine its phonemic structure. Unfortunately for so simple and lucid an interpretation of the matter, both words have closely related forms that differ in their initial orthography."

If we subtract all the examples of the vacillation of the occurrence of *u* and *ú* before vowels and *w*-signs a relatively small corpus remains. In syllabic position (i.e., between two consonants) we find only *a-ni-u-ur* vs. *a-ni-ú-úr* 'rite, performance,' *a-pu-u-uš* vs. *a-pu-ú-uš* (acc. pl.) 'those,' *ku-u-uš* vs. *ku-u-ú-uš* 'these,' *ta-pu-u-ša* vs. *ta-pu-ú-ša* 'beside, near,' *tu-u-li-ža* vs. *tu-ú-li-ža* 'council, assembly,' *hu-u-ni-ik-zi* vs. *hu-ú-ni-ik-zi* 'to cause to be bewitched.' These are probably to be explained as simple scribal errors.

Evidence against the proposed theory is also furnished by the neuter singular of the *u*-stems, cf. *aš-šu-u*, *a-aš-šu-u* 'good' where the *u* would seem to represent an etymological /u/ rather than /o/; on the other hand we actually find the *ú*-sign in the neuter singular *u*-stem noun *lu-lu-ú* 'power' (Sturtevant, 1942, 192).

Etymological evidence in favor of the existence of a contrast between /u/ and /o/ is furnished by *i-ú-kan*, *i-ú-ga-an*, dat. *i-ú-ki* 'yoke' which

seems to reflect clearly the Indo-European /u/, cf. Skt. *yugam*, Lat. *iugum*, etc.

If the 1st sg. preterit ending is indeed derived eventually from *-nun* < \**-neum* (with the present suffix *-neu*), then the preterit ending which is occasionally written *u-un* would clearly reflect a diphthong.<sup>2</sup> This would explain a 1st sg. preterit ending *-on*/. Sturtevant's counterexample (1942, 192) *la-a-ú-un* 'I loosened' is not appropriate since the *ú* here merely reflects the labial glide and the word in question is probably to be phonemicized as /lawon/. Likewise we find *ú-e-eš* 'we' with a *ú* probably representing a labial glide rather than a vowel. Also we find the doublets <sup>URU</sup>*Wi-lu-ša* and <sup>URU</sup>*Ū-lu-ša* in the same text where certainly the sign *ú* does not represent a vowel.

Sturtevant (1942, 192) says that Hittite must have inherited a diphthong in the word *ar-nu-zi* 'brings' = Skt. *móti*. Sturtevant adds that the only form of this type which he encountered with the vowel sign in the crucial position was *hu-e-nu-ú-ut* 'he caused to flee,' although here we may have a different ablaut grade with the same suffix, viz. \**-nu-* rather than \**-neu-*. Sturtevant lists the 3rd pl. present form *hu-i-nu-u-wa-an-zi* as evidence for the suffix form \**-neu-*, although here we probably have to do with the *u*-sign merely to denote the glide. The word is probably to be phonemicized /hwenwanzi/.

In favor of the hypothesis of the maintenance of a contrast between /o/ and /u/ is the 3rd sg. present *u-up-zi* '(the sun) rises,' 3rd sg. preterit *u-up-la*. As Sturtevant (1942, 192) says, the etymological connection with Gothic *iup* 'upwards,' Skt. *upa* 'up, hither,' points to the assumption of a pre-form with a diphthong. The forms in question would then be phonemicized /opzi/ and /opt/ respectively.

One can also point to the fact that the 3rd sg. imperative ending of the vocalic and diphthongal stems ends in *-ú*, cf., e.g., *na-a-ú* 'may he lead,' *pa-a-ú* 'may he give,' *da-a-ú* 'may he put,' *a-ú* 'may he see,' etc. This imperative ending may well contain the same /u/ as in Skt. *bhava-tu* 'may he become,' etc. If this is true then this may be further

2. According to Walter Petersen (1932, 202): "The first sing. in *-un* or *-nun* is based on the IE *-m* of e.g. Skt. '*a-bhara-m*, '*é-fero-n* 'bore,' with various analogical formations under the influence of numerous presents in *-nu-* ... Thus the original 1st. sing. of *ar-nu-*, 'bring up,' was \**ar-nu-n*, of *ḫatra-* 'write,' \**ḫatra-n*, but the latter was changed to *ḫatra-n-un* by analogy to the former, and ultimately this added *-un* returned to \**ar-nu-n* to form *arnu-n-un*. On the other hand, e.g. *ep-p-un* 'I took,' added the *-un* of \**arnu-n* not to the finished 1st. sing., but to the root *ep(p)-*. The *-ḫun* of the first sing. of the *ḫi*-conjugation, e.g., *ne-ḫhun* 'directed' is a contamination of *-ḫi* of the present and *-un* of the imperfect."

evidence relating the writing of *ú* to the phoneme /u/. On the other hand, this evidence is not quite as good as it might seem because the *ú* here represents the second element of a diphthong and presumably there would never be a diphthong /ao/ in Hittite anyway. At least it would be hard to see from comparative evidence how such a diphthong could arise.

It is possible that the *\*a*-stem accusative plural ending *\*/ans/* passed to *\*/os/* in Hittite. Parallels for a similar phonological development are not hard to find. In the first place the rounding and backing of a vowel before a nasal is very common, cf. the passage of the Greek *o*-stem accusative plural ending *-ons* > *-ous*. In addition loss of a nasal before a word-final *\*/s/* is quite common. A Proto-Slavic sequence *\*/uns/* passed to *\*/ūs/* word-final position, although apparently the nasalization was not lost in word-medial position, cf. Slavic *gqsĩ* 'goose' < *\*/gunsis/* < *\*/gansis/*. Thus we propose a merger of this /o/ < *\*/an[s]/* with the /o/ < *\*/au/*. This change is, of course, limited to word-final position in Hittite.

The verb 'to see,' conjugated below, is also worth discussing in this connection.

#### Present

1 sg.	u-uḫ-ḫi
2 sg.	a-ut-ti
3 sg.	a-uš-zi
1 pl.	(a-)ú-(um-)me-ni, a-ú-um-mi-e-ni
2 pl.	a-ut-te-ni, (a-)uš-te-ni
3 pl.	ú-wa-an-zi

#### Preterit

1 sg.	u-uḫ-ḫu-un
2 sg.	a-uš-ta
3 sg.	a-(ú-)uš-ta
1 pl.	a-ú-me-en
3 pl.	a-ú-(e-)ir

In this verb we seem to see the alternation between the full-grade vocalism of the singular in the forms *u-uḫ-ḫi* = /ohe/, *u-uḫ-ḫu-un* = /ohon/ vs. the zero-grade in such forms as *ú-wa-an-zi* = /wanzi/ and *ú-wa-an-du* = /wantu/. In these latter forms the initial *ú*-sign only denotes the glide. In any case a form such as *\*/uwanzi/*, if it ever existed would reflect only the automatic variant of Indo-European *\*/w/* after a heavy syllable (see Edgerton, 1943). The question as to what to make of the forms with initial *a-* is difficult to decide. Does



*au* merely reflect a premonophthongization phase of the language, an alternative way of writing /o/ or an etymological long diphthong \*/āu/. We have no solution to this problem.

Sturtevant (1953, 17) says that the phonemic system of Hittite as spoken by the scribes around 1300 B.C. was as follows:

Vowels: *a, i, u*

Semivowels: *y, w*

Nasals and liquids: *n, m, r, l*

Laryngeals: (*h*) *ḫ, ḥ*

Stops: *k, t, p, g, d, b*

Sibilant: *s*

The evidence for four of these phonemes, viz., the voiced counterparts of (*h*)*ḫ, k, t, p* depends upon the interpretation of the doubled consonant writing and is perhaps somewhat tenuous. On the other hand, the number of phonemes, viz. eighteen, is not too high and we believe that by adding three phonemes we would get a slightly more plausible phonemic system. We are, however, of the opinion that the number of phonemes usually given for Hittite is on the low side. Usually languages with a relatively small number of phonemes have long words, but the words of Hittite do not strike us as being especially long. This seems to be added evidence that there were in Hittite phonemic contrasts not evidenced by the orthography.<sup>3</sup>

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3. After this article had been written, Professor Hans Güterbock pointed out to us several additional articles on this subject. One of the most interesting is O. Carruba's review of Johannes Friedrich's *Die hethitischen Gesetze* in *Kratylos*, 7 (1962): 155-160. Here Carruba points out that in the older versions of the Hittite Law (viz. KBoVI2) we find consistently the 3 sg. ending *-i-iz-zi* (a few times *-i-e-zi*), whereas in the younger version (viz. KBoVI5) we find *-i-a-zi* or *-i-ja-a-zi*. According to Carruba (p. 159): "Eine regelrechte lautliche Entwicklung bzw. starke analogische Auswirkung scheint sich hier abzuzeichnen: von (*i* zu *e* zu *ja*)." As can be seen from the body of the article, it is after the phonemic merger of \*/(C)jæ/ and \*/(C)ja/ that one can expect the result of the merger to occupy a more central position, viz. we would indeed expect the neutralized vowel to move to the articulatorily neutral position. In other words, we would expect that \*/(C)jæ/ would move to \*/(C)ja/. It could well be that the differences in usage in the different texts are merely the result of different scribal practices. On the other hand, the passage of \*/jæ/ > /ja/ would be an exact parallel to what we know has happened in Slavic, and if Carruba is indeed right, his analysis would serve as support for the hypothesis advanced in this article.

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